3.2 Medical Requirements Overview

TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW

MRID# and Title:	MR005S Radiation Monitoring using Shuttle TEPC for Short Duration Flights
Sponsor:	Medical Operations
IPT:	Radiation
Category:	Medical Requirements (MR)
References:	JSC 13956 STS MORD, Rev G Section 4.5 Radiation Safety • Section 4.5.1 Preflight • Section 4.5.3 In-Flight Monitoring
Purpose/Objectives:	To collect radiation environment data that will document crew exposure to radiation, perform risk assessment, and manage crew exposures during flight, especially during radiation contingencies.
Measurement Parameters:	Radiation exposures at the tissue level, lineal energy spectral data.
Deliverables:	Characterization of the radiation environment for updating exposure records for occupational health risk assessments. Real-time data for use during radiation contingencies.
Flight Duration:	≥ 30 days
Number of Flights:	All high altitude/high inclination Shuttle flights
Number and Type of Crew Members Required:	Designated crewmembers will be assigned as operators.
Other Flight Characteristics:	The TEPC shall be supplied for high-altitude (greater than or equal to 205 nautical miles) and/or high-inclination flights (greater than or equal to 50 degrees).

3.3 Preflight Training

TABLE 3.3: PREFLIGHT TRAINING

Preflight Training Activity Description:	Training classes will introduce the radiation hardware, procedures and review the radiation environment in space. The location and function of the hardware is detailed.			
Schedule:	**Duration:**	**Schedule:**	**Flexibility:**	**Personnel Required:**
	TEPC Training 45 min	L-2 months	N/A	Crewmember/Trainer
Ground Support Requirements Hardware/Software	**Preflight Hardware:**	**Preflight Software:**	**Test Location:**	
	Tissue Equivalent Proportional Counter (TEPC)	N/A	U.S.	
Training Facilities	**Minimum Room Dimensions:**	**Number of Electrical Outlets:**	**Temperature Requirements:**	**Special Lighting:**
	8' x 10'	One (110 volts AC)	Ambient	N/A
	Hot or Cold Running Water:	**Privacy Requirements:**	**Other:**	
	N/A	N/A	1 Table, 4-6 Chairs	
Constraints/Special Requirements:	N/A			
Launch Delay Requirements:	Training will be repeated if requested by the crewmember.			
Notes:	At L-10 days the crew is informed of all projected exposures and current and projected space weather conditions.			

3.4 Preflight Activities – No Preflight Activities

3.5 In-Flight Activities

TABLE 3.5.1: IN-FLIGHT ACTIVITIES

In-Flight Activity Description:	The TEPC will operate continuously on Shuttle to provide radiation measurements of tissue dose and dose equivalent. Space Radiation Analysis Group (SRAG) may request that the crew call down a quick reading of the TEPC, if necessary, as stated in the flight rules.		
Schedule:	**Duration:**	**Schedule:**	**Personnel Required:**
	TEPC Initial Power On 10 min.	***Flight Day 1*** Crew will switch on once	1 crewmember
	TEPC Call-Down (if required) 10 min. (includes recording data into chart at the end of the TEPC procedures)	As necessary	1 crewmember
	TEPC Power Down 5 min.	***Last Flight Day*** Crew will switch off prior to deorbiting	1 crewmember
Procedures:	All in-flight procedures are contained within the Orbit Ops/All/Gen book. TEPC Power On TEPC Power Down TEPC Malfunction Contingency Data Call-down/Data Chart		
Constraints / Special Requirements:	N/A		
Photo / TV Requirements:	N/A		
Cold Stowage Requirements:	N/A		
Mission Extension Requirements:	N/A		
Landing Wave-Off Requirements:	If landing wave-off of one day is to occur, TEPC is to be restarted.		
Data Delivery	**Data/Report to Designated Recipients (Nominal/Contingency):**		
	N/A		

In-Flight Activities, (cont.)

TABLE 3.5.2: IN-FLIGHT HARDWARE

Hardware/Software Name	P/N	ISS Location	Vehicle (Up/Dn)	Category	Late Access / Early Destow/ Early Return	Docked Ops	Weights (kg)	Volume (cm^3)	Dimensions LxWxH (cm)	Power (watts)	Resupply	Download / Downlink
Tissue Equivalent Proportional Counter (TEPC) Kit	SED46115993-XXX	AV BAY 3A – Above lockers MA9D and MA16D	Shuttle	N/A	N/A	N/A	8.5	47195	50.8 x 30.5 x 30.5	28 VDC	N/A	N/A

3.6 Postflight Activities

TABLE 3.6: POSTFLIGHT ACTIVITIES

Postflight Activity Description:	Submittal of final mission report.		
Schedule:	**Duration:**	**Schedule:**	**Personnel Required:**
	N/A	N/A	N/A
Constraints/Special Requirements:	N/A		
Early Destow / Early Return:	N/A		
Notes:	N/A		
Data Delivery	**Data/Report to Designated Recipients (Nominal/Contingency):**		**Data Archives:**
	A comprehensive report will be delivered to the Radiation Health Officer at approximately R+45 days. The report will then be forwarded by the Radiation Health Officer to the crew surgeon and data archivist at approximately R+3 months.		Crewmember radiation exposure from each mission and their accumulated radiation exposure will be recorded in crewmembers' medical records and the mission specific medical records.

3.7 Summary Schedule

TABLE 3.7: SUMMARY SCHEDULE

ACTIVITY	DURATION	SCHEDULE	PERSONNEL REQUIRED	CONSTRAINTS
Preflight Training				
TEPC Training	45 min	L-2 months	Crewmembers/Trainer	None
Preflight Activity: N/A				
In-Flight				
TEPC Initial Power-On	10 min.	***Flight Day 1*** Crew will switch on once	1 crewmember	None
TEPC Checkout (TEPC call-down)	10 min.	As necessary	1 crewmember	None
TEPC Power-Off	5 min.	***Last Flight Day*** Crew will switch off prior to deorbiting	1 crewmember	None
Wheels-Stop: N/A				
Postflight: N/A				
Postflight Debrief				
Debrief	No extra time	~R+30 days	Crewmembers/Radiation Team	Included as part of the Med Ops overall debrief.